

## WHAT IS CLAIMED IS:

### 1. A distributed simulation system comprising:

5           a plurality of nodes arranged to perform a simulation of a system under test,  
              wherein the plurality of nodes are configured to communicate simulation  
              commands and signal values for the system under test using message  
              packets transmitted between the plurality of nodes, and

10           at least one of the plurality of nodes is configured to log the message packets in  
              one or more log files during the simulation.

2. The distributed simulation system as recited in claim 1 wherein, if a first node of the  
plurality of nodes fails during the simulation, the distributed simulation system is  
15           configured to establish a second node, and wherein a third node of the plurality of nodes  
is configured to read message packets that were transmitted to the first node from the log  
file and to transmit the message packets to the second node.

3. The distributed simulation system as recited in claim 2 wherein the distributed  
20           simulation system is configured to pause the simulation prior to transmitting the message  
packets to the second node, and wherein one of the plurality of nodes is configured to  
resume the simulation subsequent to transmitting the message packets from the log file to  
the second node.

25           4. The distributed simulation system as recited in claim 2 wherein the third node is  
further configured to detect message packets in the log file which were sourced by the  
first node, and wherein the third node is configured to verify that the second node  
transmits corresponding message packets.

5. The distributed simulation system as recited in claim 2 wherein the second node is configured to load a simulator state corresponding to a simulation checkpoint, and wherein the third node is configured to transmit, to the second node, message packets that were transmitted to the first node if the message packets occurred after the simulation checkpoint, and wherein the third node is configured not to transmit, to the second node, message packets that were transmitted to the first node if the message packets occurred prior to the simulation check point.
6. The distributed simulation system as recited in claim 1 wherein the node logging the message packets is a hub of the distributed simulation system.
7. The distributed simulation system as recited in claim 6 wherein the hub logs each message packet transmitted in the distributed simulation system in one or more log files.
8. The distributed simulation system as recited in claim 1 wherein each of the plurality of nodes is configured to log message packets in a respective one of the log files.
9. The distributed simulation system as recited in claim 8 wherein the respective one of the one or more log files contains only the message packets received by the corresponding node of the plurality of nodes and the message packets transmitted to the corresponding node.
10. The distributed simulation system as recited in claim 1 wherein the node logging message packets is a distributed control node.
11. The distributed simulation system as recited in claim 10 wherein one of the plurality of nodes is a hub, and wherein the hub is configured to route message packets to the distributed control node even if the message packets are not otherwise destined for the distributed control node.

12. The distributed simulation system as recited in claim 11 wherein the distributed control node logs each message packet transmitted in the distributed simulation system in the one or more log files.

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13. An apparatus comprising:

a first node configured to simulate a portion of a system under test; and

10 instructions which, when executed, read first message packets from a log file,  
wherein the first message packets were transmitted to a node simulating  
the portion in a preceding simulation, and wherein the instructions, when  
executed, transmit the first message packets to the first node during the  
simulation, and wherein the instructions, when executed, read second  
15 message packets from the log file, wherein the second message packets  
were sourced by the node simulating the portion in the preceding  
simulation, and wherein the instructions, when executed, verify that the  
first node sources corresponding message packets during the simulation.

20 14. The apparatus as recited in claim 13 wherein the log file contains only the first  
message packets and the second message packets.

15. The apparatus as recited in claim 13 wherein the log file contains each message  
packet transmitted in the preceding simulation.

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16. The apparatus as recited in claim 15 wherein the instructions, when executed, ignore  
message packets other than the first message packets and the second message packets in  
the log file.

17. The apparatus as recited in claim 13 wherein the simulation excludes other portions of the system under test.

18. The apparatus as recited in claim 13 wherein the instructions are executed in a  
5 second node coupled to the first node.

19. The apparatus as recited in claim 13 wherein the instructions are executed by the first node.

10 20. A method comprising:

performing a simulation of a system under test in a plurality of nodes of a  
distributed simulation system, the plurality of nodes configured to  
communicate simulation commands and signal values for the system under  
15 test using message packets transmitted between the plurality of nodes; and

logging the message packets in one or more log files during the simulation by at  
least one of the plurality of nodes.

20 21. The method as recited in claim 20 further comprising:

a first node of the plurality of nodes failing during the simulation;

establishing a second node responsive to the failing; and

25 transmitting message packets to the second node that were transmitted to the first  
node, the message packets read from the log file.

22. The method as recited in claim 21 further comprising:

pausing the simulation prior to transmitting the message packets to the second node; and

5           resuming the simulation subsequent to transmitting the message packets from the log file to the second node.

23. The method as recited in claim 21 further comprising:

10           detecting message packets in the log file which were sourced by the first node; and

            verifying that the second node transmits corresponding message packets.

15   24. The method as recited in claim 21 further comprising the second node loading a simulator state corresponding to a simulation checkpoint, and wherein transmitting message packets to the second node comprises transmitting, to the second node, message packets that were transmitted to the first node if the message packets occurred after the simulation checkpoint, and not transmitting, to the second node, message packets that  
20   were transmitted to the first node if the message packets occurred prior to the simulation check point.

25   25. The method as recited in claim 20 wherein the node logging the message packets is a hub of the distributed simulation system.

26. The method as recited in claim 20 wherein the logging comprises each of the plurality of nodes logging message packets in a respective one of the one or more log files.

27. The method as recited in claim 20 wherein the node logging message packets is a distributed control node.

28. The method as recited in claim 27 wherein one of the plurality of nodes is a hub, the  
5 method further comprising the hub routing message packets to the distributed control node even if the message packets are not otherwise destined for the distributed control node.

29. The method as recited in claim 20 further comprising:  
10 reading message packets from the log file which were transmitted to a node  
simulating a first portion of the system under test during the simulation for  
transmission to a first node simulating a portion of the system under test in  
a second simulation including the portion and excluding other portions of  
15 the system under test; and  
transmitting the message packets to the first node.

30. The method as recited in claim 20 further comprising:  
20 reading message packets from the log file which were transmitted by a node  
simulating a first portion of the system under test during the simulation,  
the reading performed during a second simulation including a first portion  
of the system under test and excluding other portions of the system under  
25 test; and  
verifying the message packets are transmitted by a first node simulating the first  
portion in the second simulation.

31. One or more carrier media comprising instructions which, when executed, log, in one or more log files, message packets transmitted during a simulation between a plurality of nodes forming a distributed simulation system, the message packets communicating simulation commands and signal values for a system under test being simulated in the simulation.

32. The carrier media as recited in claim 31 further comprising instructions which, when executed, establish a second node responsive to a first node of the plurality of nodes failing during the simulation, and wherein the instructions, when executed, transmit message packets to the second node that were transmitted to the first node, the message packets read from the log file.

33. The carrier media as recited in claim 32 further comprising instructions which, when executed, pause the simulation prior to transmitting the message packets to the second node, and resume the simulation subsequent to transmitting the message packets from the log file to the second node.

34. The carrier media as recited in claim 32 further comprising instructions which, when executed, detect message packets in the log file which were sourced by the first node, and verify that the second node transmits corresponding message packets.

35. The carrier media as recited in claim 32 further comprising instructions which, when executed, load a simulator state corresponding to a simulation checkpoint into the second node, and wherein transmitting message packets to the second node comprises transmitting, to the second node, message packets that were transmitted to the first node if the message packets occurred after the simulation checkpoint, and not transmitting, to the second node, message packets that were transmitted to the first node if the message packets occurred prior to the simulation check point.

36. The carrier media as recited in claim 31 further comprising instructions which, when executed:

5           read message packets from the log file which were transmitted to a node  
          simulating a first portion of the system under test during the simulation for  
          transmission to a first node simulating a portion of the system under test in  
          a second simulation including the portion and excluding other portions of  
          the system under test; and  
10           transmit the message packets to the first node.

37. The carrier media as recited in claim 31 further comprising instructions which, when executed:

15           read message packets from the log file which were transmitted by a node  
          simulating a first portion of the system under test during the simulation,  
          the reading performed during a second simulation including a first portion  
          of the system under test and excluding other portions of the system under  
          test; and  
20           verify the message packets are transmitted by a first node simulating the first  
          portion in the second simulation.